



December 13, 2013

Jennifer Timian  
Chief, Recall Management Division  
National Highway Traffic Safety Administration  
NVS-215, Room W46-421  
1200 New Jersey Avenue, SE  
Washington, DC 20590

Dear Ms. Timian,

The following information is submitted in accordance with National Highway Traffic Safety Administration's reporting regulations, 49CFR Part 573.6.

Zero Motorcycles Inc. has determined that a defect which relates to motor vehicle safety exists on certain model year 2012 and 2013 Zero Motorcycles motorcycles.

**IDENTIFICATION OF EQUIPMENT POTENTIALLY CONTAINING THE DEFECT:**

The recall population of 667 motorcycles includes:

- 2012 model year Zero XU model motorcycles built 10/21, 2011 through 07/25, 2012
- 2012 model year Zero S model motorcycles built 10/21, 2011 through 07/05, 2012
- 2012 model year Zero DS model motorcycles built 10/21, 2011 through 04/03, 2013
- 2013 model year Zero XU model motorcycles built 01/31, 2013 through 05/21, 2013
- 2013 model year Zero FX model motorcycles built 01/25, 2013 through 06/20, 2013
- 2013 model year Zero S model motorcycles built 01/21, 2013 through 11/08, 2013
- 2013 model year Zero DS model motorcycles built 01/24, 2013 through 10/21, 2013

This covers the entire range of motorcycles potentially containing the subject defect.

**DESCRIPTION OF DEFECT:**

The subject motorcycles have a controller firmware that may react to infrequently encountered signal faults by discontinuing controller power to the motor. Should one of these faults occur while the motorcycle is being ridden, the controller's response may result in an inadvertent quits-while-running condition, which could lead to a crash.

**CHRONOLOGY OF EVENTS:**

On 09/12/2012, Zero Motorcycles concluded that certain 2012 model year motorcycles had a motor encoder position signal that could drift over the extended use of the motorcycle. Should the encoder signal drift too far, it could fall beyond the signal limits expected by the motor controller. This condition could cause the motor controller firmware to respond to such a signal fault by discontinuing power to the motor, resulting in the inadvertent loss of power of the motorcycle, which could lead to a possible crash. In response to the conclusion of its investigation, Zero Motorcycles determined that a defect related to motor vehicle safety existed and declared a voluntary recall program (12V-455). The remedy in this program

involved a new controller firmware and configuration, which compensates for the possible drift of the motor encoder position signal to ensure it remains within the limits expected by the controller.

Over the next several months, Zero Motorcycles received reports of 2012 and 2013 model year motorcycles that exhibited similar quits-while-running behavior. Since the analysis of each of these reports revealed a variety of unrelated faults as the root cause of the inadvertent power interruption, on 09/20/2013 Zero Motorcycles personnel traveled to Sevcon's headquarters in the United Kingdom to better understand the reason behind such behavior (Sevcon Limited is the manufacturer of the subject controller and developer of its firmware). During the ensuing investigation after this meeting, it became clear to Zero Motorcycles and Sevcon that these random, infrequent and unrelated signal faults could not be avoided in the lifetime of the motorcycle, and that the controller firmware needed to deal with these faults in a different, more reasonable manner.

On 12/05/2013, Zero Motorcycles completed its internal investigation of this concern and concluded that 2012 and 2013 model motorcycles built with a Sevcon controller prior to 11/08/2013 have firmware that could respond to infrequent signal faults by discontinuing controller power to the motor, which could lead to a quits-while-running situation. Zero Motorcycles executive management considered this information and determined that a defect related to motor vehicle safety existed.

Zero Motorcycles is not aware of any accidents or injuries caused by this condition.

**DESCRIPTION OF THE PROGRAM TO REMEDY THE DEFECT:**

The remedy of this defect is for Zero Motorcycles dealers to update the suspect vehicles with revised controller firmware that deals with these infrequent faults in a way that does not result in an inadvertent quits-while-running condition.

**SUPPLIER INFORMATION:**

Sevcon Limited  
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England  
Tel: +44 (0) 191 497 9000  
Fax: +44 (0) 191 482 4223  
CEO: Matt Boyle  
Contact Person: Rick Hodsdon

**DEALER AND OWNER NOTIFICATION:**


Zero Motorcycles expects to notify its dealer network no later than the week of December 23, 2013 and motorcycle owners no later than the week of December 30, 2013.

**Part 577 NOTICE LETTER:**

A draft of the owner notification letter is attached.

Please advise the undersigned of the campaign assigned by ODI to this recall.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Richard Kenton', with a long horizontal flourish extending to the right.

Richard Kenton  
Director of Customer Service  
Zero Motorcycles Inc.